

**We Claim:**

1. A process for regiospecific chlorination of an aromatic or aliphatic compound with a chlorine source comprising a metal chloride and other than  $\text{Cl}_2$  and  $\text{SO}_2\text{Cl}_2$  in presence of hypervalent iodine catalyst and in acidic medium.
2. A process as claimed in claim 1 wherein the aliphatic compound is selected from alkanes and alkenes.
3. A process as claimed in claim 1 wherein the aromatic compound is selected from arenes.
4. A process as claimed in claim 1 wherein the reaction is carried out at a temperature in the range of  $70\text{-}80^\circ\text{C}$  for a time period in the range of 4-24 h.
5. A process as claimed in claim 1 wherein the reaction is terminated by bringing the reaction mixture to ambient temperature followed by extracting and purifying the product.
6. A process as claimed in claim 5 wherein the extraction is done by solvent extraction.
7. A process as claimed in claim 1 wherein the chlorine source is sodium chloride.
8. A process as claimed in claim 1 wherein the hypervalent iodine (iodine valency ranging from +3 to +7) catalyst is selected from the group consisting of  $\text{NaIO}_4$  and  $\text{PhI}(\text{Oac})_2$ , preferably  $\text{NaIO}_4$  in liquid phase.
9. A process as claimed in claim 1 wherein the reactants are dissolved in a solvent selected from the group consisting of DMF, dioxane,  $\text{H}_2\text{O}$ , acetonitrile, chloroform, ethylene dichloride, and any combination thereof.
10. A process as claimed in claim 9 wherein the solvent comprises a combination of  $\text{CH}_3\text{CN}$ : water (2:1).
11. A process as claimed in claim 1 wherein the pH of the reaction mixture is brought to a range of 2-6 by addition of 10-20% mineral acid solution.